



# U.S. Geological Survey Open-File Report 03-039

## Figure 1

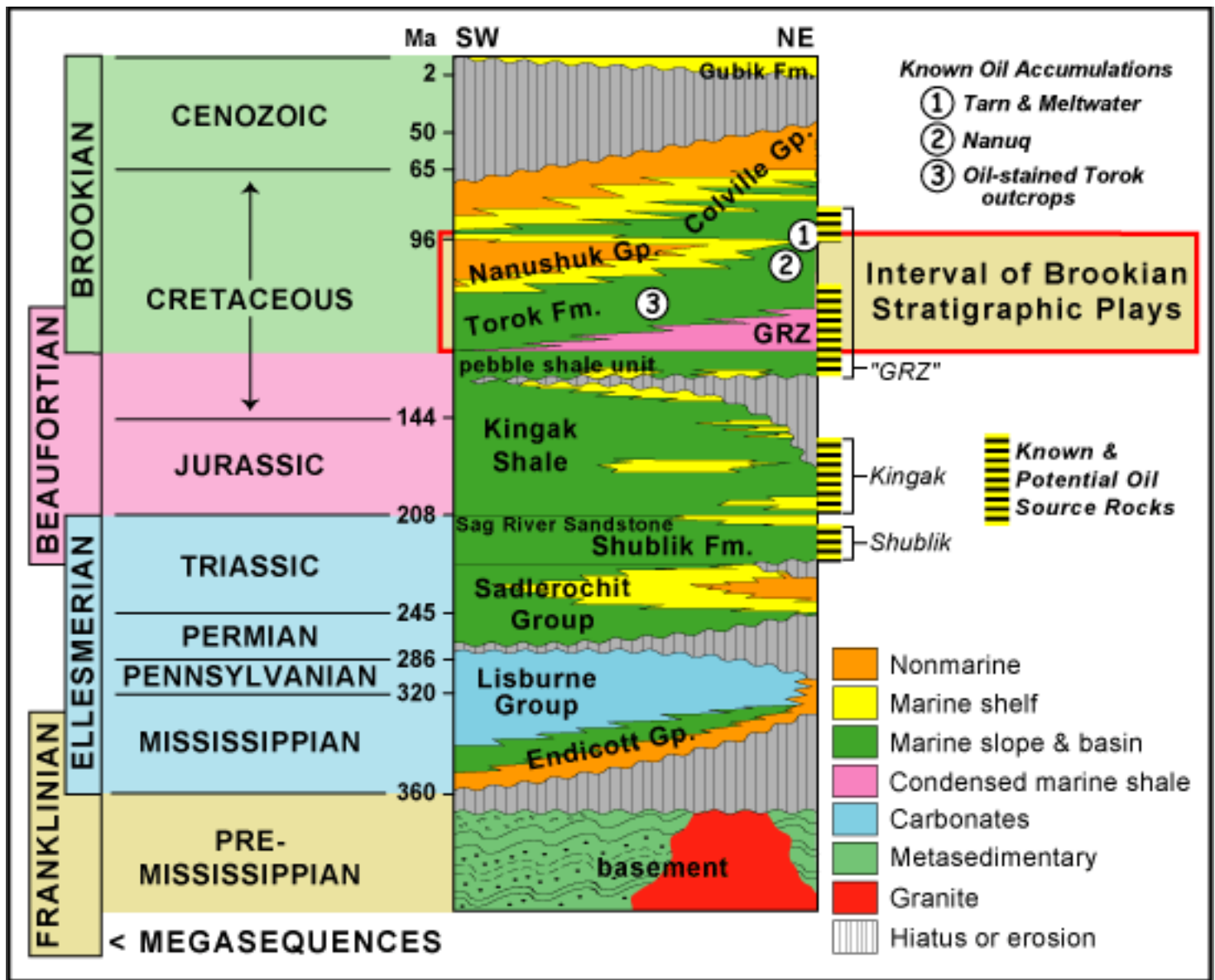


Figure 1. Stratigraphy in the National Petroleum Reserve in Alaska (NPRA) showing stratigraphic positions of Brookian stratigraphic plays, known oil source rocks, and known oil accumulations (including heavily oil-stained Torok outcrops).



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## Figure 2

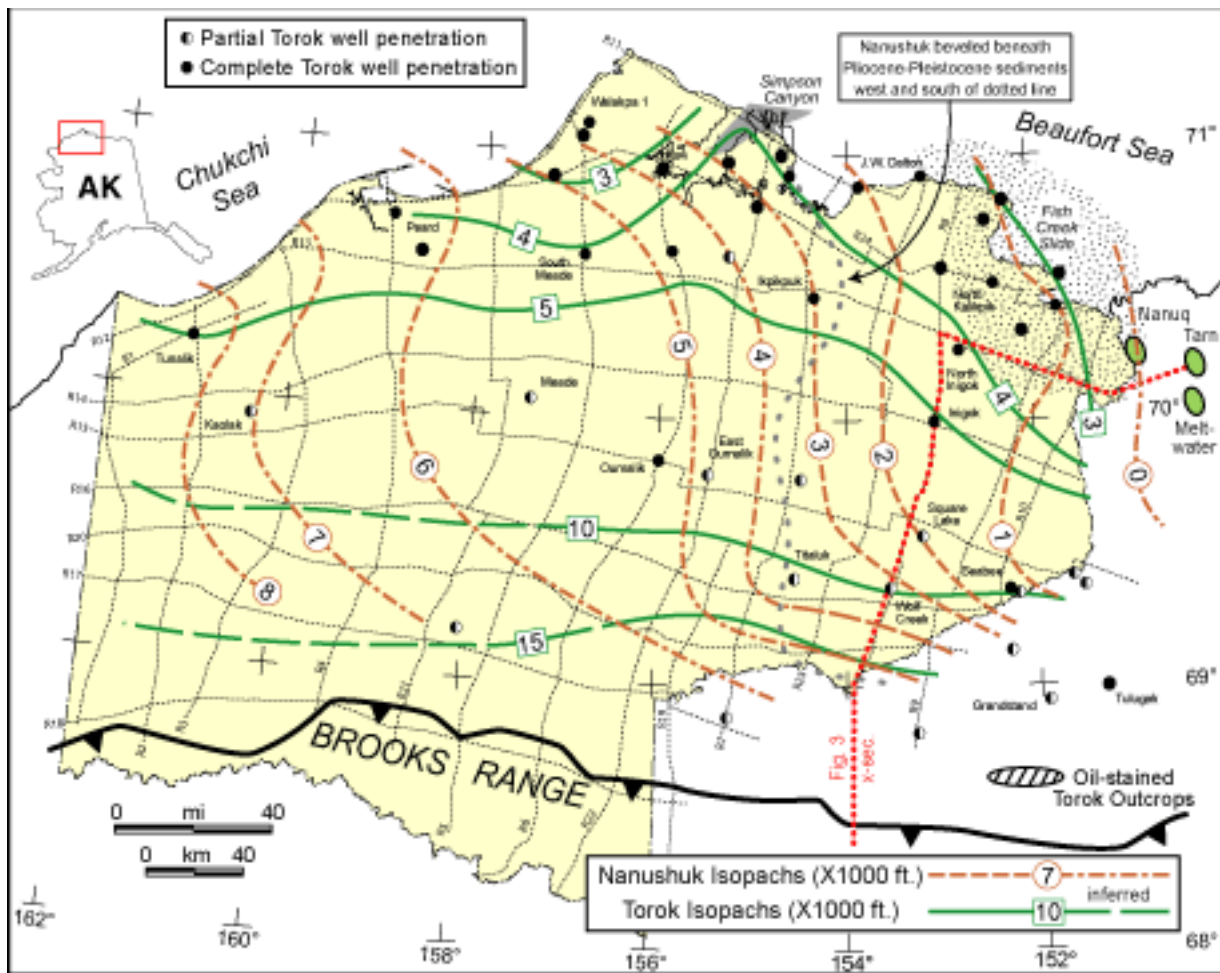


Figure 2. Map of NPSA showing grid of seismic lines used in this study, generalized Torok and Nanushuk thickness contours (from Bird, 1988), locations of wells that penetrate Torok Formation, locations of cross section shown in Fig. 3.



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Figure 3

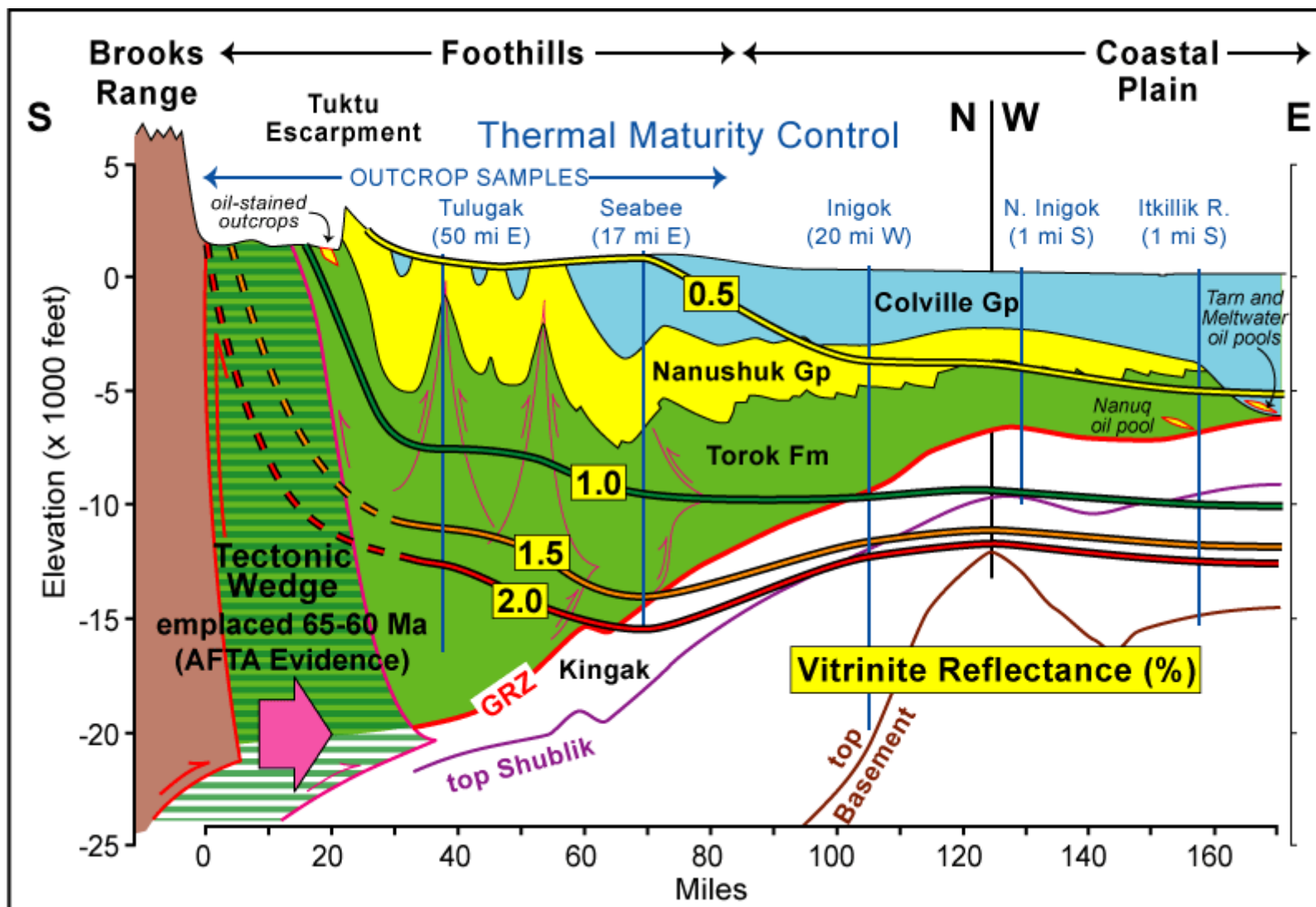


Figure 3. Generalized cross-section, based on regional seismic lines, showing geology of Brookian strata in eastern NPRA and adjacent areas. Subsurface thermal maturity control projected onto cross-section from wells shown; surface thermal maturity control based on analysis of outcrop samples. Generalized locations of Tarn, Meltwater, and Nanuq oil accumulations and of heavily oil-stained Torok outcrops are shown. Schematic tectonic wedge is based on the interpretations of Moore and Potter (this volume). Location of this cross section is shown in Fig. 2.





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Figure 4

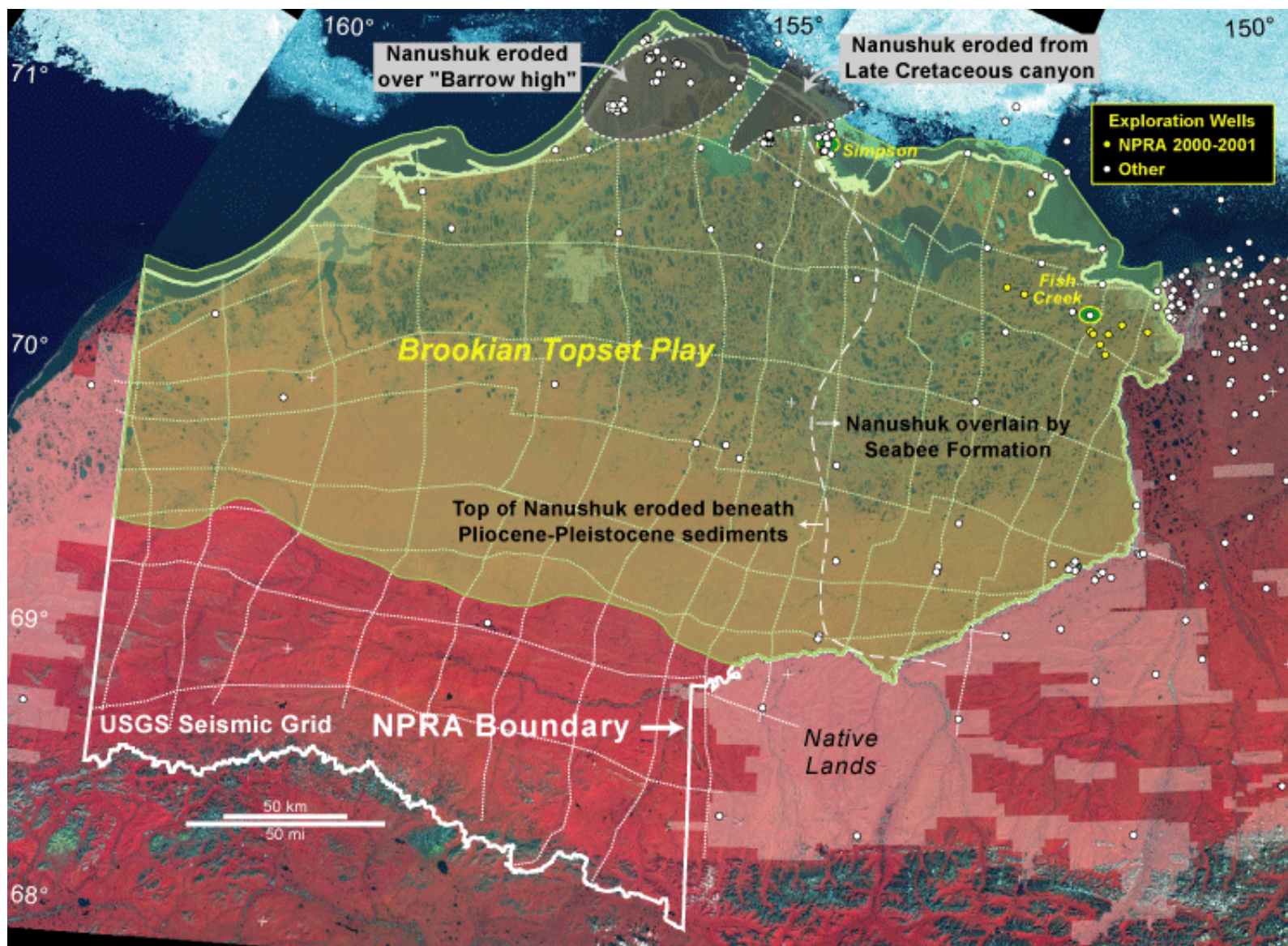


Figure 4. Map of Brookian topset play area, regional seismic lines, and well control in and near NPRA.



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Figure 5

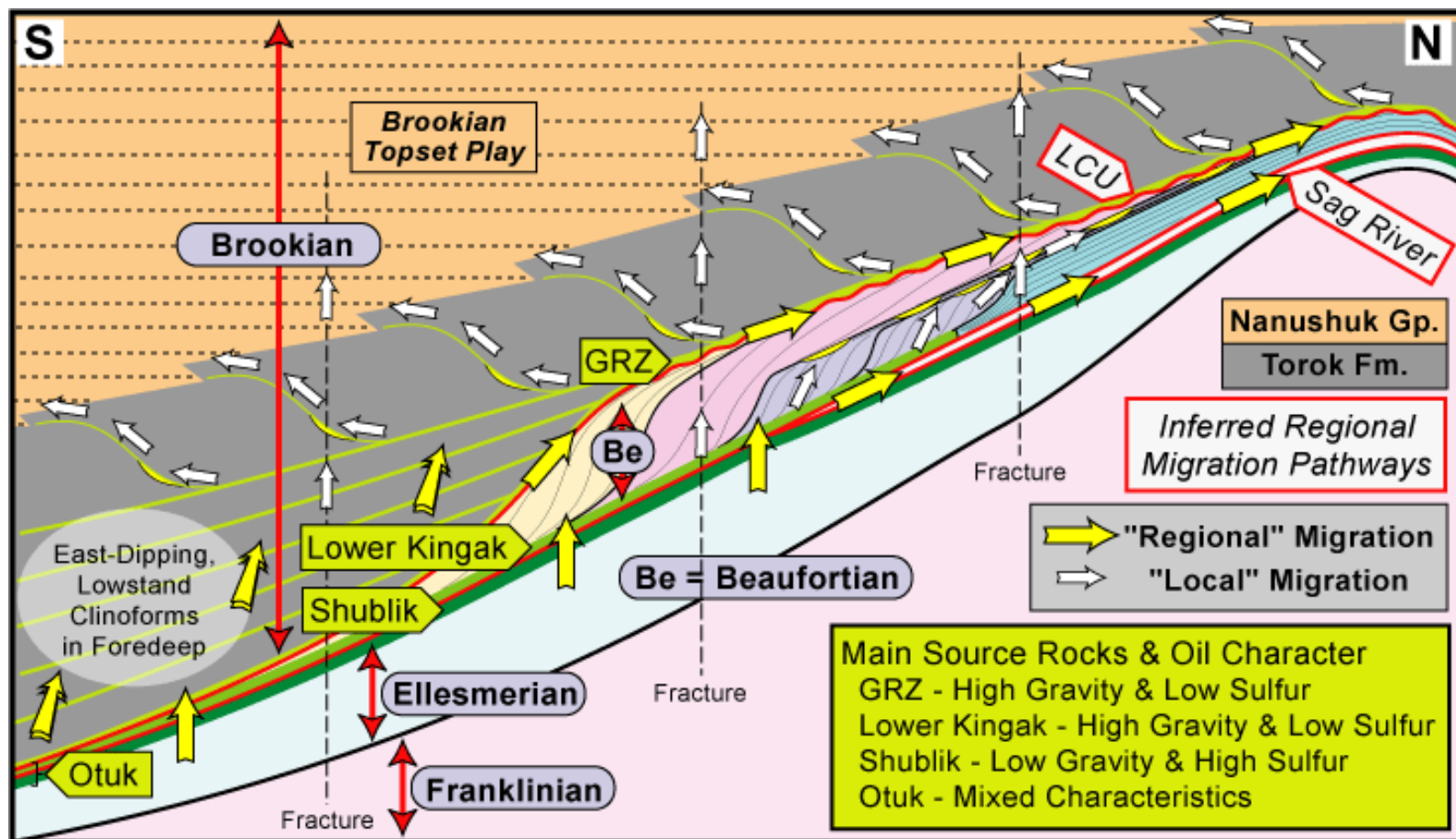


Figure 5. Schematic south-north cross section in eastern NPRA showing stratigraphic positions of major source rocks, generalized geometry of Brookian and Beaufortian strata, and inferred scenarios for migration of hydrocarbons from source rocks to stratigraphic traps in Brookian Topset Play.





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Figure 6

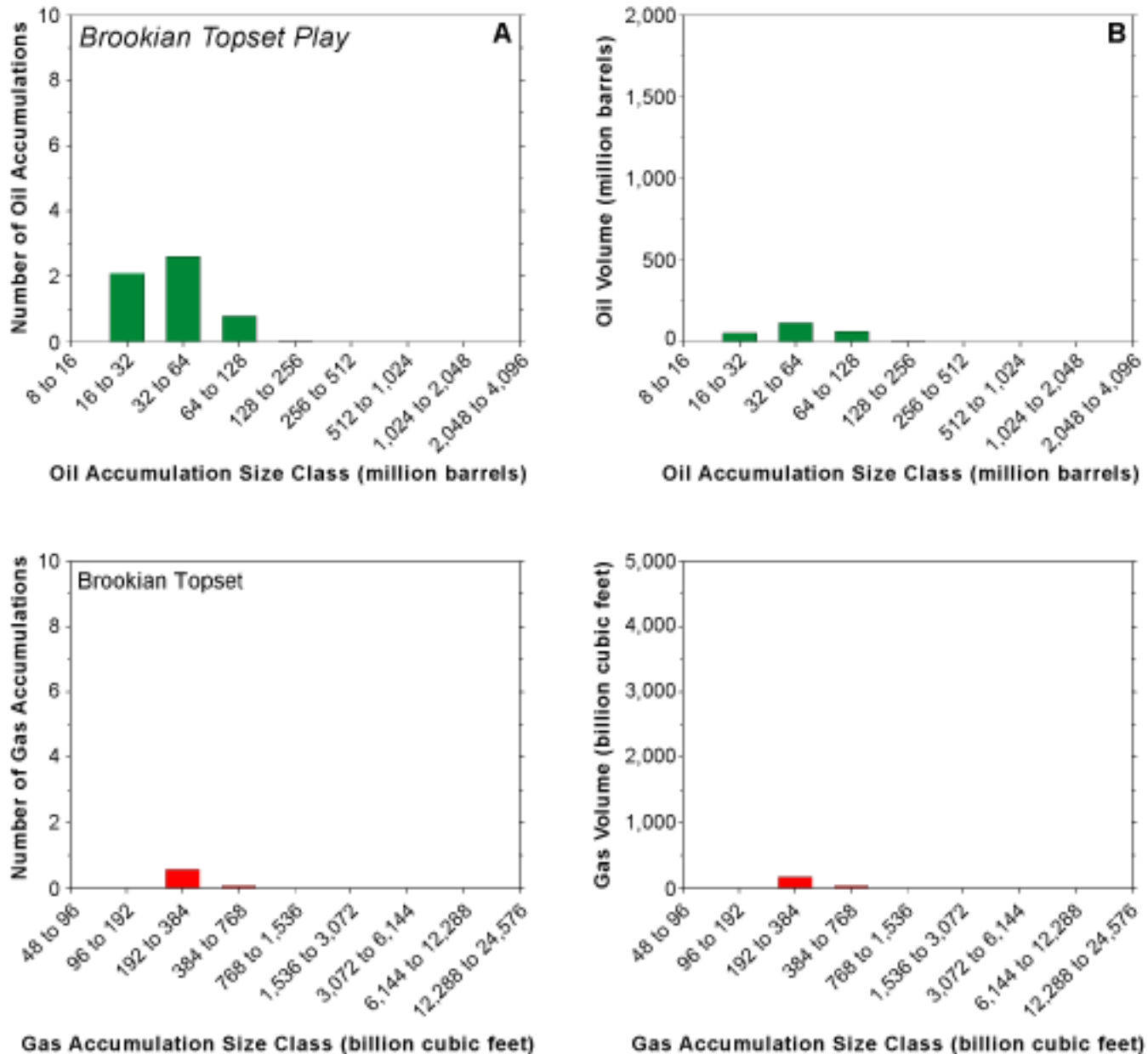


Figure 6. Summary of technically recoverable oil grouped by accumulation size class estimated to occur in the Brookian Topset Play in NPRA. Both histograms are based on the mean estimate of technically recoverable oil in the play. (A) Number of accumulations grouped by oil accumulation size class. (B) Volume of oil in each accumulation size class. The left “tail” of each histogram is controlled by the assessment methodology, which is limited to accumulations larger than 50

million barrels of in-place oil or 250 billion cubic feet of technically recoverable natural gas.



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Figure 7

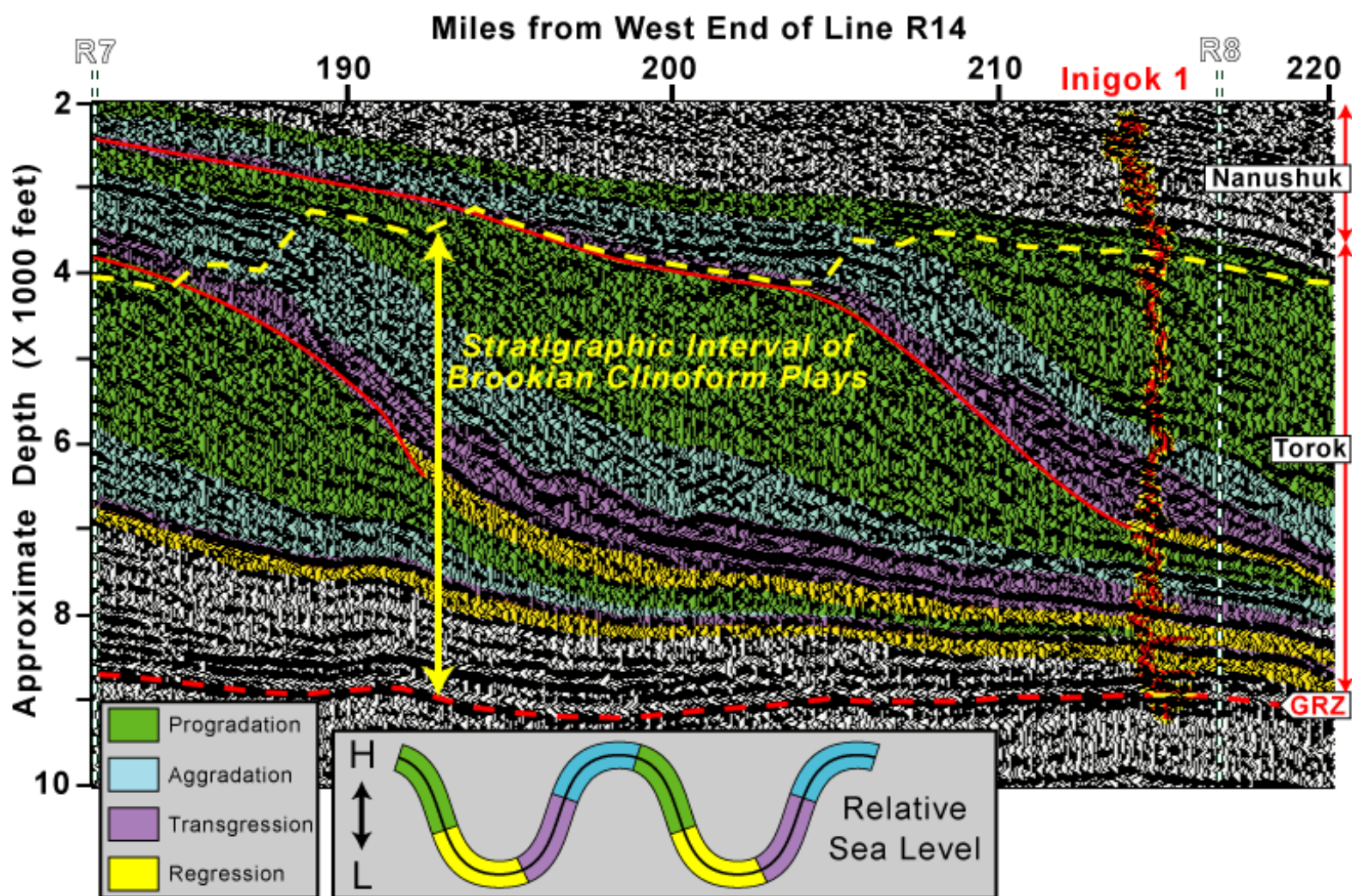


Figure 7. Segment of USGS seismic line R14 illustrating seismic expression of Torok clinoforms and delineation of systems tracts discussed in text. Stratigraphic interval of the Brookian Clinoform Plays is delineated by red (lower) and yellow (upper) dashed lines. Location of this seismic line segment is shown in Fig. 9.





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Figure 8

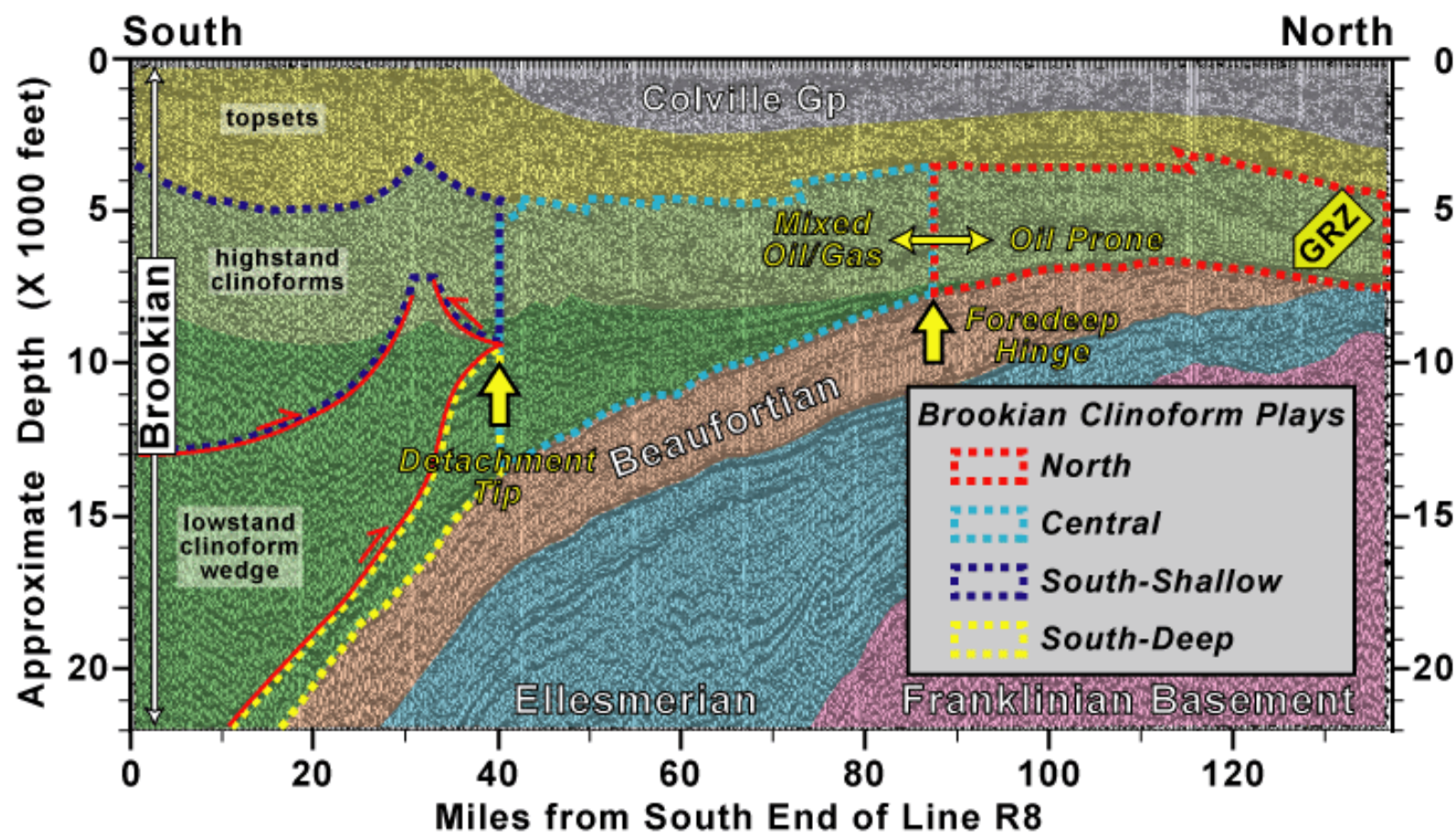


Figure 8. Regional south-north seismic section illustrating the definition of foredeep hinge and structural detachment tip within lower Torok Formation. The stratigraphic and structural delineations of the Brookian Clinoform North, Central, South-Shallow, and South-Deep plays also are shown. Location of seismic line shown in Fig. 9. See text for additional explanation.





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Figure 9

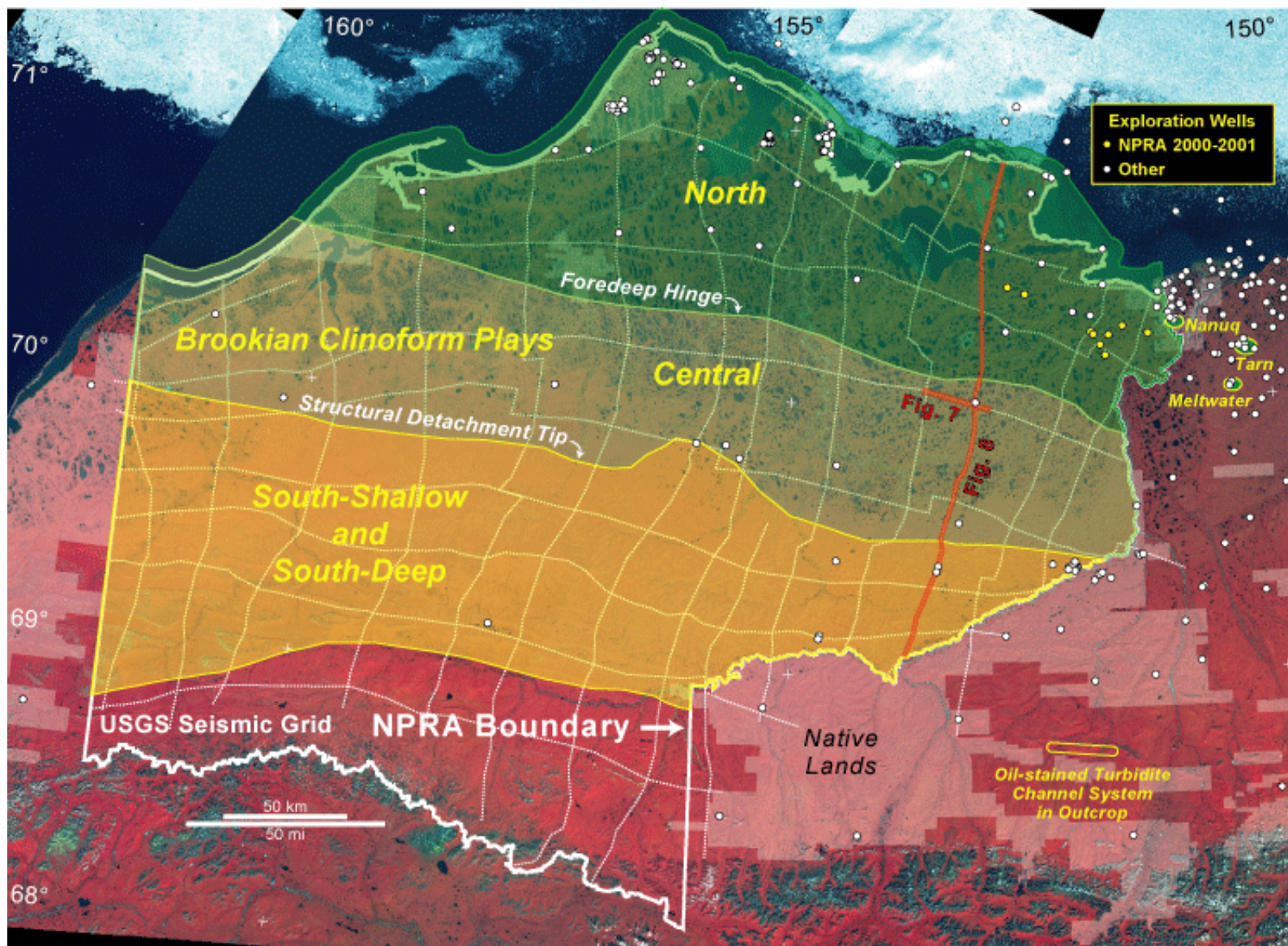


Figure 9. Map of Brookian clinoform play areas, regional seismic lines, and well control in and near NPRA. Note that boundary between north and central play areas is defined by the foredeep hinge line, and that boundary between central and south play areas is defined by the structural detachment tip line. Note location of seismic line segments shown in Figs. 7 and 8.



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Figure 10

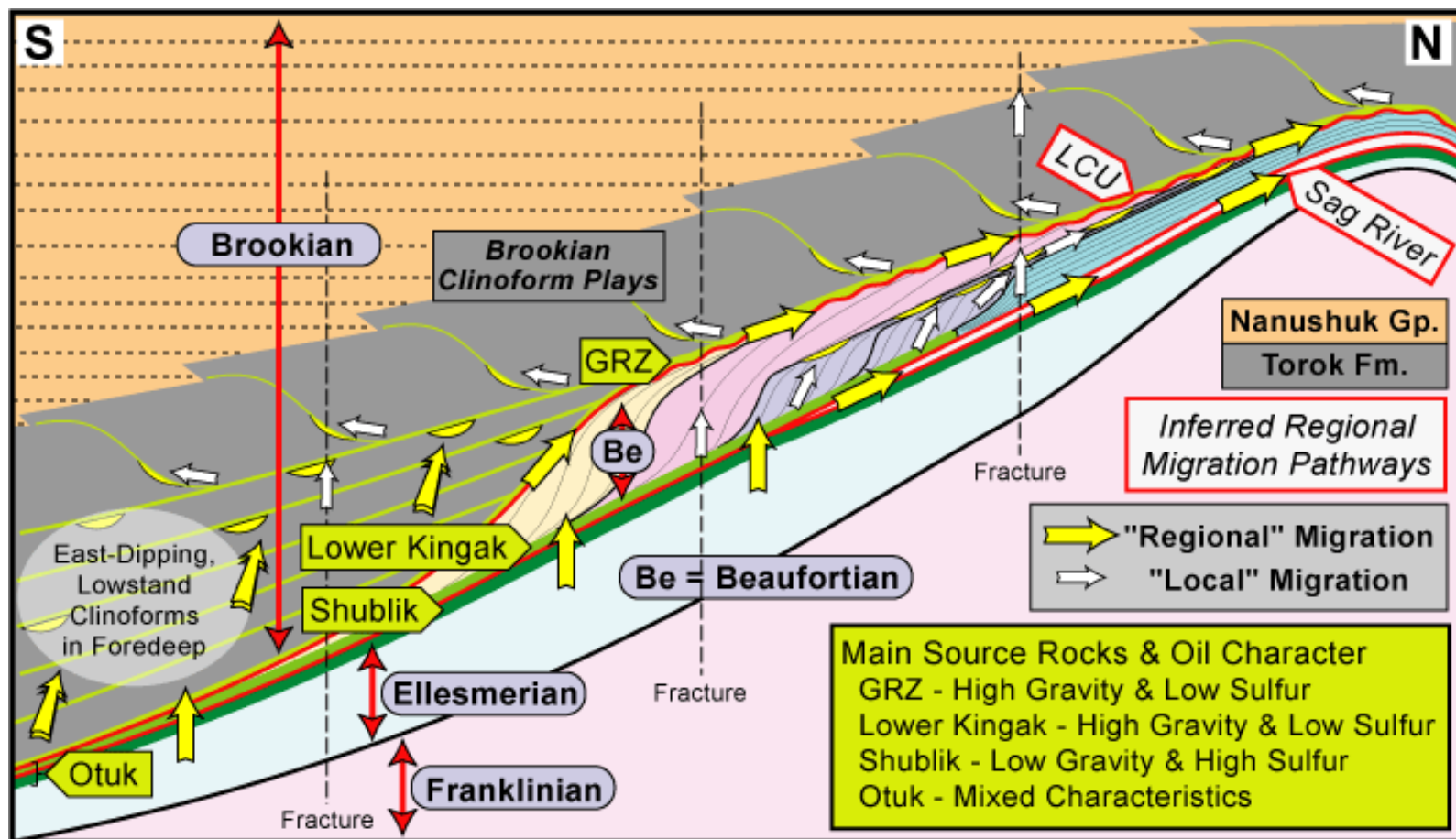


Figure 10

Figure 10. Schematic south-north cross section in eastern NPRA showing stratigraphic positions of major source rocks, generalized geometry of Brookian and Beaufortian strata, and inferred scenarios for migration of hydrocarbons from source rocks to stratigraphic traps in Brookian clinoform plays.





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Figure 11

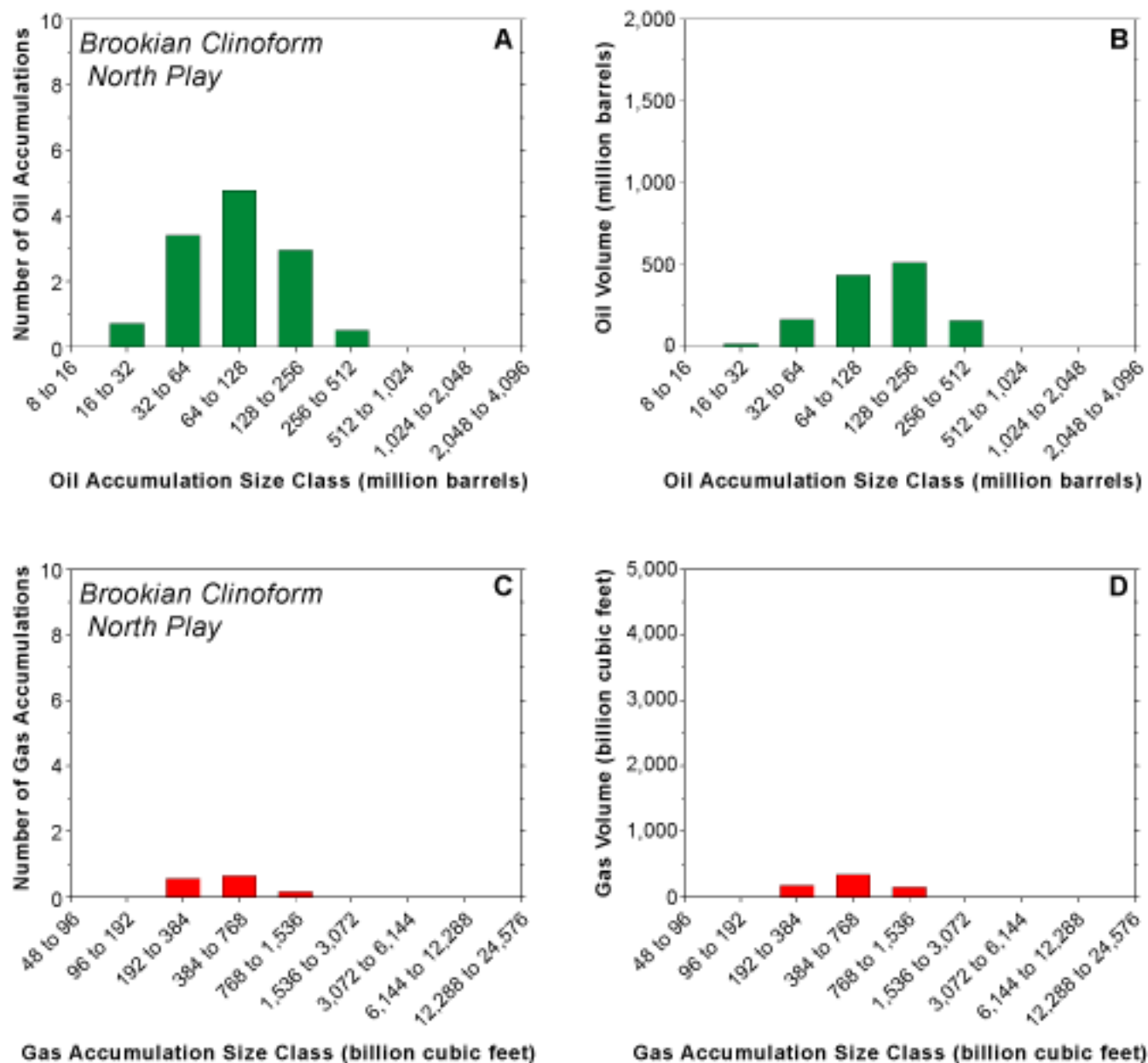


Figure 11. Summary of technically recoverable oil and gas grouped by accumulation size class estimated to occur in the Brookian Clinoform North Play in NPRA. Histograms are based on the mean estimates of technically recoverable oil and non-associated gas in the play. (A) Number of oil accumulations grouped by oil accumulation size class. (B) Volume of oil in each accumulation size class. (C) Number of non-associated gas accumulations grouped by gas

accumulation size class. (D) Volume of non-associated gas in each accumulation size class. The left “tail” of each histogram is controlled by the assessment methodology, which is limited to accumulations larger than 50 million barrels of in-place oil or 250 billion cubic feet of technically recoverable natural gas.



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Figure 12

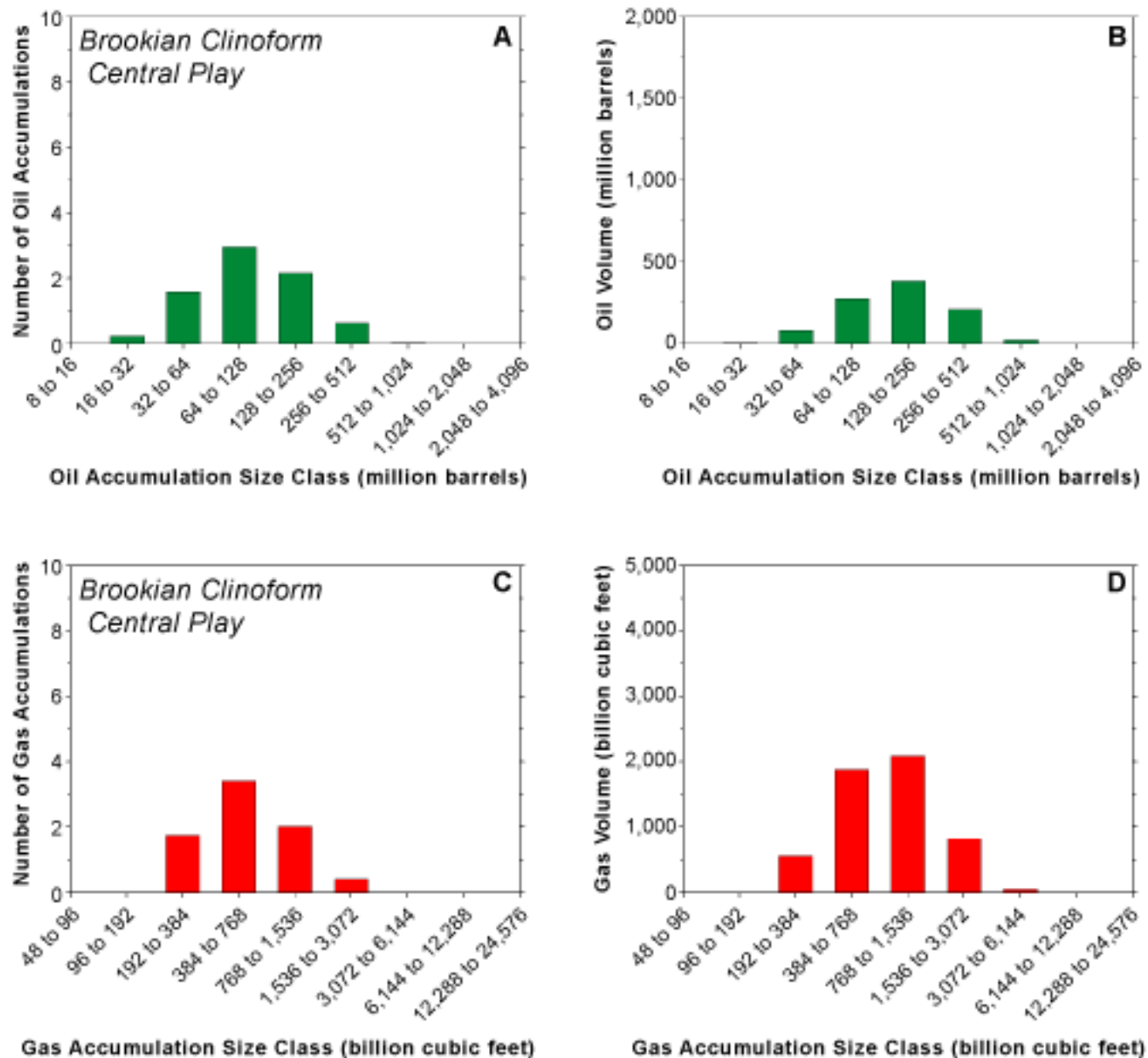


Figure 12. Summary of technically recoverable oil and gas grouped by accumulation size class estimated to occur in the Brookian Clinoform Central Play in NPRA. Histograms are based on the mean estimates of technically recoverable oil and non-associated gas in the play. (A) Number of oil accumulations grouped by oil accumulation size class. (B) Volume of oil in each accumulation size class. (C) Number of non-associated gas accumulations



grouped by gas accumulation size class. (D) Volume of non-associated gas in each accumulation size class. The left “tail” of each histogram is controlled by the assessment methodology, which is limited to accumulations larger than 50 million barrels of in-place oil or 250 billion cubic feet of technically recoverable natural gas.



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Figure 13

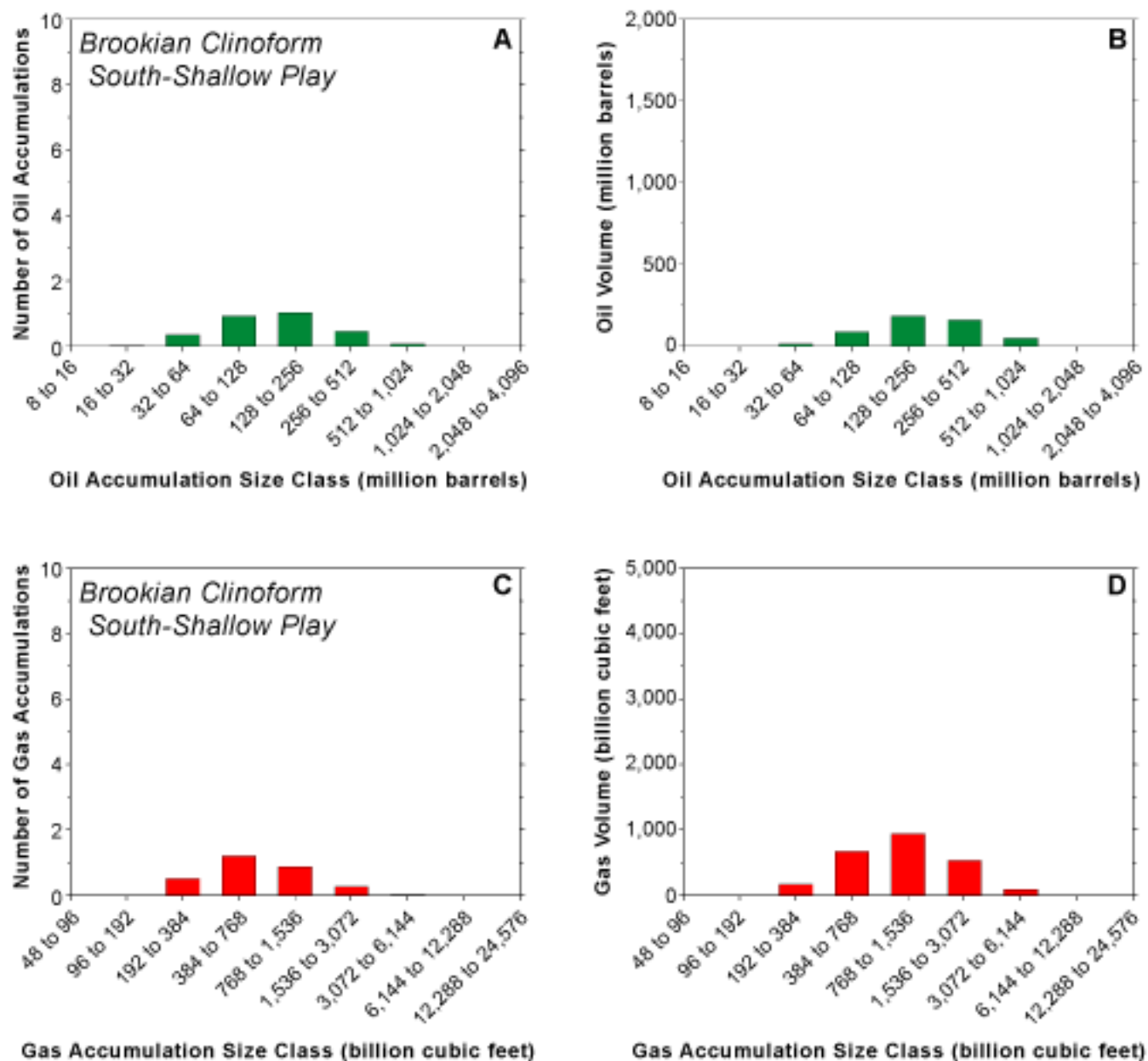


Figure 13. Summary of technically recoverable oil and gas grouped by accumulation size class estimated to occur in the Brookian Clinoform South-Shallow Play in NPRA. Histograms are based on the mean estimates of technically recoverable oil and non-associated gas in the play. (A) Number of oil accumulations grouped by oil accumulation size class. (B) Volume of oil in each accumulation size class. (C) Number of non-associated gas accumulations

grouped by gas accumulation size class. (D) Volume of non-associated gas in each accumulation size class. The left “tail” of each histogram is controlled by the assessment methodology, which is limited to accumulations larger than 50 million barrels of in-place oil or 250 billion cubic feet of technically recoverable natural gas.<sup>3</sup>





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Figure 14

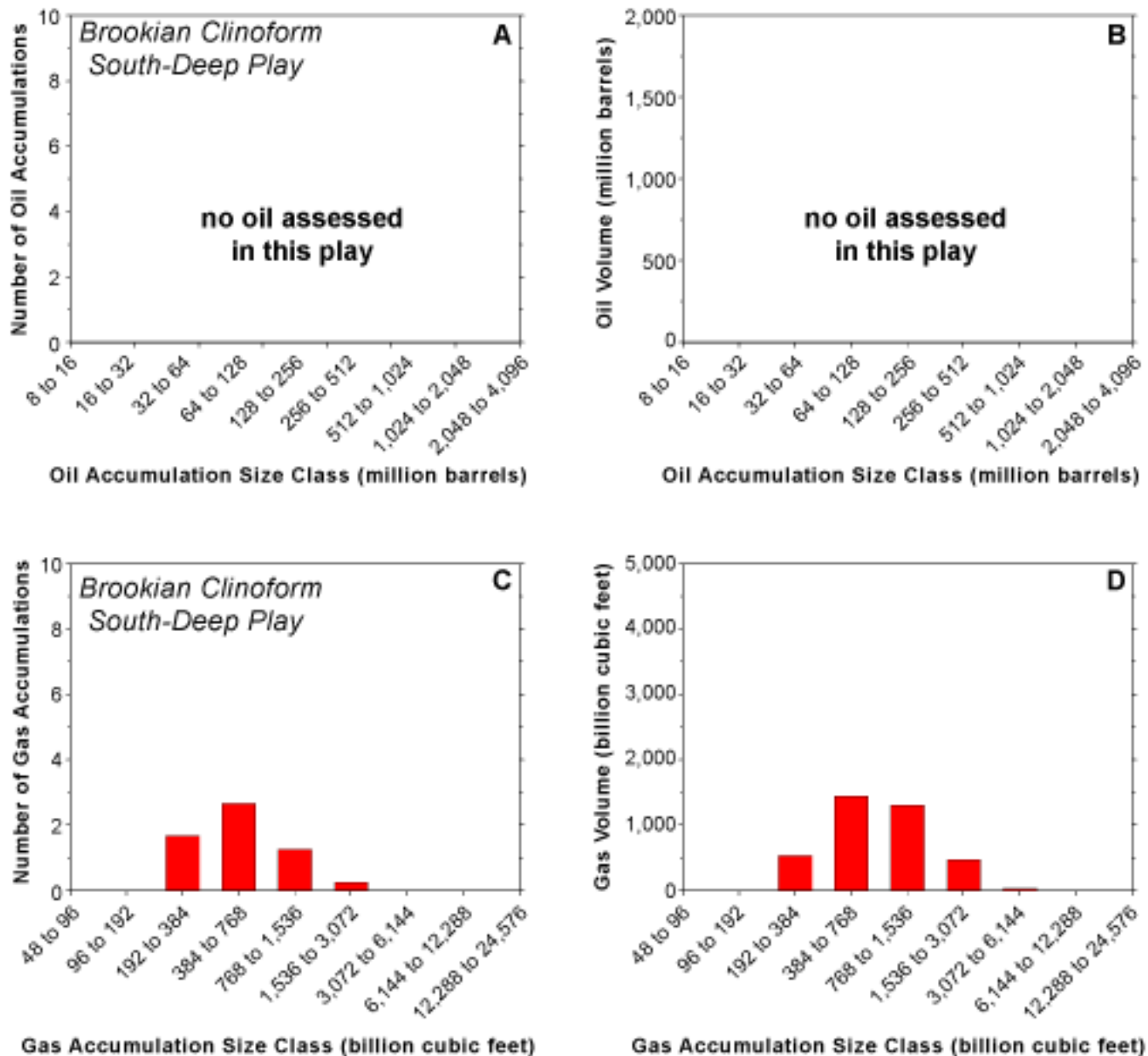


Figure 14. Summary of technically recoverable gas grouped by accumulation size class estimated to occur in the Brookian Clinoform South-Deep Play in NPRA. Histograms are based on the mean estimates of technically recoverable, non-associated gas in the play. (A) Number of non-associated gas accumulations grouped by gas accumulation size class. (B) Volume of non-associated gas in each accumulation size class. The left “tail” of each histogram is controlled by

the assessment methodology, which is limited to accumulations larger than 50 million barrels of in-place oil or 250 billion cubic feet of technically recoverable natural gas.